WHAT IS CLAIMED IS:

1. A speech encoding method comprising:

generating an excitation signal using an adaptive codebook storing a past excitation signal;

generating a synthesized speech signal using the excitation signal;

modifying the excitation signal used to generate the synthesized speech signal by filter processing; and

storing the modified excitation signal in the adaptive codebook.

2. A method according to claim 1, wherein the filter processing is executed by an excitation filter having low-pass characteristics.

3. A method according to claim 1, wherein the modifying step is performed by a recursive filter expressed by $R(z) = 1/(1 - klz^{-1})$ (kl: filter coefficient) in a z-transform domain.

4. A method according to claim 1, wherein the excitation signal generating step generates the excitation signal by using a first code vector generated from the adaptive codebook and a second code vector generated from a codebook different from the adaptive codebook.

5. A speech encoding method comprising:

generating an excitation signal by using a first code vector obtained from an adaptive codebook storing a past excitation signal and a second code vector

obtained from another codebook;

selecting code information representing a first code vector by using the adaptive codebook so as to reduce perceptually weighted distortion between a target vector obtained from an input speech signal and a synthesized vector obtained from a candidate vector of the first code vector;

selecting code information representing a second code vector from the codebook so as to reduce perceptually weighted distortion of the synthesized speech signal;

generating an excitation signal by using the selected first and second code vectors;

modifying the generated excitation signal by filter processing; and

storing the modified excitation signal in the adaptive codebook.

6. A method according to claim 5, wherein the modifying step is performed by a recursive filter expressed by $R(z) = 1/(1 - klz^{-1})$ (kl: filter coefficient) in a z-transform domain.

7. A method according to claim 5, wherein the filter processing is executed by an excitation filter having low-pass characteristics.

8. A speech decoding method comprising:

generating an excitation signal using an adaptive codebook storing a past excitation signal;

generating a synthesized speech signal using the excitation signal;

modifying the excitation signal used to generate the synthesized speech signal by filter processing; and

storing the modified excitation signal in the adaptive codebook.

9. A method according to claim 8, wherein the filter processing is executed by an excitation filter having low-pass characteristics.

10. A method according to claim 8, wherein the modifying step is performed by a recursive filter expressed by $R(z) = 1/(1 - klz^{-1})$ (kl: filter coefficient) in a z-transform domain.

11. A method according to claim 8, wherein the excitation signal generating step generates the excitation signal by using a first code vector generated from the adaptive codebook and a second code vector generated from a codebook different from the adaptive codebook.

12. An electronic apparatus comprising:

a speech encoder configured to execute the speech encoding method according to claim 1; and

a speech input device configured to supply a speech signal to said speech encoder.

13. An electronic apparatus comprising:

a speech decoder configured to execute the speech decoding method according to claim 8; and

a speech output device configured to output a speech signal from said speech decoder.

14. An electronic device comprising:

a speech encoder configured to execute the speech encoding method according to claim 1;

a speech decoder configured to execute a speech decoding method comprising:

generating an excitation signal using an adaptive codebook storing a past excitation signal;

generating a synthesized speech signal using the excitation signal;

modifying the excitation signal used to generate the synthesized speech signal by filter processing; and

storing the modified excitation signal in the adaptive codebook.;

a speech input device configured to supply a speech signal to said speech encoder; and

a speech output device configured to output a speech signal from said speech decoder.

15. A speech encoding method comprising:

generating an excitation signal by using a first code vector obtained from an adaptive codebook storing a past excitation signal and a second code vector obtained from another codebook;

modifying the excitation signal by filter processing; and

storing the modified excitation signal in the adaptive codebook.

16. A method according to claim 15, wherein the filter processing is executed by an excitation filter having low-pass characteristics.

17. A method according to claim 15, wherein the modifying step is performed by a recursive filter expressed by $R(z) = 1/(1 - klz^{-1})$ (k1: filter coefficient) in a z-transform domain.

18. A speech encoding apparatus comprising:

an adaptive codebook configured to store a past excitation signal;

a synthesized speech signal generator configured to generate a synthesized speech signal using an excitation signal generated by using said adaptive codebook; and

an excitation filter configured to modify the excitation signal by filter processing and store a modified excitation signal in said adaptive codebook.

19. A speech encoding apparatus comprising:

a first codebook configured to store a past excitation signal and generate a first code vector;

a second codebook configured to generate a second code vector;

a first code vector selector configured to select code information representing the first code vector by using said first codebook so as to reduce perceptually

weighted distortion between a target vector obtained from an input speech signal and a synthesized vector obtained from a candidate vector of the first code vector;

a second code vector selector configured to select code information representing the second code vector from said second codebook so as to reduce perceptually weighted distortion of the synthesized speech signal;

an excitation signal generator configured to generate an excitation signal by using the selected first and second code vectors;

an excitation signal modifier configured to modify the generated excitation signal by filter processing, and store a modified excitation signal in said first codebook.

20. A speech decoding apparatus comprising:

an adaptive codebook configured to store a past excitation signal;

a synthesized speech signal generator configured to generate a synthesized speech signal using an excitation signal generated by using said adaptive codebook; and

an excitation filter configured to modify the excitation signal by filter processing and store a modified excitation signal in said adaptive codebook.

21. An electronic apparatus comprising:

a speech encoder according to claim 18; and

a speech input device configured to supply a speech signal to said speech encoder.

22. An electronic apparatus comprising:

a speech decoder according to claim 20; and

a speech output device configured to output a speech signal from said speech decoder.

23. An electronic device comprising:

a speech encoder according to claim 18;

a speech decoder comprising:

an adaptive codebook configured to store a past excitation signal;

a synthesized speech signal generator configured to generate a synthesized speech signal using an excitation signal generated by using said adaptive codebook; and

an excitation filter configured to modify the excitation signal by filter processing and store a modified excitation signal in said adaptive codebook;

a speech input device configured to supply a speech signal to said speech encoder; and

a speech output device configured to output a speech signal from said speech decoder.